Online Customer Engagement as A Mediating Variable Between Social-Media Marketing and Customer Satisfaction: Using Big Data Analytics and Natural Language Processing

مشاركة العملاء عبر الإنترنت كمتغير وسيط بين التسويق عبر وسائل التواصل الاجتماعي ورضا العملاء: بإستخدام تحليلات البيانات الضخمة ومعالجة اللغة الطبيعية

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Abstract

Purpose – This study empirically investigates marketing activities on social media of American airline firms and assesses their impact on firm performance and customer satisfaction. More than 3 million tweets are retrieved from the firms' Twitter timelines over 60 months from 2017 to 2021. These tweets are then analyzed using machine learning algorithms and big data analytics.

Design/methodology/approach – The authors using Big Data Analytics and Natural Language Processing beside additional company-specific covariates in the control variables to adjust for other characteristics that are well known to effect social media marketing, online consumer engagement, and firm performance represented in customer satisfaction.

Findings – Reveal that, in general, social media marketing positively affects both online customer engagement and customer satisfaction. Furthermore, the analyses show that online customer engagement enhances firms' customer satisfaction. The findings also show that online customer engagement fully mediates the impact of a company's social media marketing on its customer satisfaction score.

Practical implications – The current study extends the brand literature's previous operationalization of customer engagement behavior with social media activities by assessing consumption, contribution, and creation activities collaboratively, and translating it into action. Therefore, the literature shows several gaps in the research on customer engagement on social media, especially in the sector of airline companies.

. **Originality/value** –Our findings imply that American airline companies' use of social media to boost trendiness, customization, and entertainment pays off in terms of enhancing customer engagement with brand-related social media content. As a result, this research shows its most significant implications for practice which is the importance of investing in the trendiness, customization, and entertainment aspects of social media activities for American airline firms.

Keywords: Big data analytics, machine learning, social media marketing, natural language processing, customer engagement, customer satisfaction.

<u>**ملخص البحث**</u>

تبحث هذه الدراسة بشكل تجريبي في الأنشطة التسويقية عبر وسائل التواصل الاجتماعي لشركات الطيران الأمريكية وتقييم تأثيرها على أداء الشركة غير المالي المتمثل في رضا العملاء. وفي هذا السياق فقد تم استخدام تحليلات البيانات الضخمة من خلال تحليل أكثر من٣ مليون تغريدة تم استردادها من فترة تمتد ل ٦٠ شهرًا تشمل الفترة من٢٠١٧-٢٠٢١ ومعالجة اللغة الطبيعية ، وبعدها تم تحليل هذه التغريدات باستخدام خوارزميات التعلم الآلي وتحليلات البيانات الضخمة.

وقد كشفت النتائج ، بشكل عام ، أن التسويق عبر وسائل التواصل الاجتماعي يؤثر بشكل إيجابي على مشاركة العملاء عبر الإنترنت ومستوي رضاهم.

علاوة على ذلك ، أظهرت التحليلات أن مشاركة العملاء عبر الإنترنت تعزز من رضا العملاء لدى المنظمات.

كما أظهرت النتائج أيضًا أن مشاركة العملاء عبر الإنترنت تتوسط بشكل كامل تأثير التسويق عبر وسائل التواصل الاجتماعي للمنظمة ومستوي رضا العملاء.

والجدير بالذكر أن هذه الدراسة تقدم لباحثي وممارسي التسويق رؤى جديدة حول الاستثمار في تصميم وتنفيذ وإدارة الجهود التسويقية عبر وسائل التواصل الاجتماعي، تأثيرها داخل المنظمة وعلى مشاركة العملاء عبر الإنترنت ، والتي تؤثر بدورها على رضا العملاء

الكلمات الرئيسية: تحليلات البيانات الضخمة ، التعلم الآلي ، التسويق عبر وسائل التواصل الاجتماعي ، معالجة اللغة الطبيعية ،مشاركة العملاء ، رضا العملاء

1. Introduction

Social media refers to virtual networks, platforms, and applications that attempt to encourage interactions, collaborations, and content sharing. (Richter & Koch, 2007). The key significant factor in the subject of social media is the technology platforms (Willis 2019) Weblogs, social blogs, microblogging, wikis, podcasts, photos, video, rating, and social bookmarking are a variety of forms and examples of it.

Social media has the potential to keep businesses in touch with their customers online. In addition to using social media to connect with peers, many people want businesses to engage in a similar level of connection with their customers. Furthermore, social media has provided insight into how social media brand pages can result in brand love. Furthermore, social media has provided insight into how social media brand pages can lead to brand love (Palazon et al 2019); analyzing consumers' sentiments based on tweets and user-generated content (Saura et al 2021); generating citizen participation (Kant et al 2021); and supporting companies' public relations efforts (Oncioiu et al 2021).

The rapid growth of social media has altered the way brands communicate with their customers, bringing new difficulties as well as possibilities for brands (Kim & Ko, 2012). Because of the companies' need to maintain uniqueness and exclusivity, the similarities between brands and mass-media platforms (e.g., social media) have long been questioned. as well as build one-to-one interactions with specific customers (Quach & Thaichon, 2017). Brands, on the other hand, have progressively used social media over the last decade (Kim & Ko, 2010, 2012), realizing its "strong" ability to engage with customers (Koivisto and Mattila, 2018, p. 1). As a result, understanding how brands may use social media to engage and effect customers through focused use of social media is crucial, resulting in increased customer satisfaction rates (Dauriz et al 2014).

Big data from both corporate and consumer activities is now available, allowing researchers to analyze firm-consumer interactions via social media (Kunz et al., 2017). Big data could assist brand managers in better understanding social media participation and, as a result, develop more effective customer engagement initiatives.

Many businesses set up their own Twitter profiles or post on Facebook. When businesses and customers communicate without regard to time, place, or media, firms can gain exposure and strengthen relationships with customers.

Social media marketing (SMM) is a two-way communication channel in which businesses and customers collaborate to develop new products, services, business models, and values. Furthermore, brand social media operations allow for the elimination of misunderstanding and bias toward organizations while also elevating brand value by providing a forum for individuals to share thoughts and information online. With the rising use of social media marketing, quantifying its effects has become critical. As a result, the goal of this study is to investigate the influence of American airline firms' social media marketing activities on online customer engagement and satisfaction using big data analytics. According to the literature, there is no consensus on the precise definition of customer engagement-based concepts. Therefore, the research employs natural language processing and statistical analysis to process more than three million tweets generated by nine airline firms in the USA. The data are collected over 60 months from 2017 to 2021 and analyzed to extract a set of mediator measures. Then, the measures are employed to build an econometric model and validate the research hypotheses.

Companies are recognizing that engagement is a more strategic approach to customer and stakeholder relationships (Kumar et al., 2010). Practitioners feel that high levels of customer engagement are required for long-term success. They also suggest that low customer engagement hurts success, both in terms of dropped sales or prospects and unfavorable word-of-mouth (WOM). (EIU survey 2007). In the meantime, Bijmolt *et al.* (2010) stated that customer satisfaction is one building block of a customer engagement strategy. In particular, management of customer satisfaction requires the elaboration of tools that prevent customer defection and help enable the allocation of resources across the customer base (Shaffer and Zhang 2002). It is worth noting that some business executives are not utilizing social media to promote customer engagement (Umunna 2021) resulting in customer dissatisfaction that reflects a potential loss of profit.

Therefore, this study responds to marketing researchers' calls for research on the relationship between a firm's social media marketing activities and the

resulting consumer engagement behaviors, as well as the impact on customer satisfaction levels [1]. (Kunz and colleagues 2017) Furthermore, the study's findings will aid airline managers in making reasonable resource allocation decisions among numerous drivers of social media marketing operations in order to enrich the use of social media to affect customer engagement behaviors and levels of customer satisfaction.

2. Literature Review

This part examines the research's literature review, which covers social media marketing, customer engagement, and customer satisfaction.

2.1.Social Media Marketing

Social media services make innovative use of new technologies to accomplish the familiar communication and marketing goals (Kraft et al 2021). The use of these internet services for relationship selling (i.e., selling focused on creating rapport with customers) is referred to as social media marketing. Customer interest in brands on the internet began in the early 1990s, with the advent of social networking sites such as Yahoo and AOL, which allowed customers to discuss their preferences and thoughts about various items (Kozinets, 2001). Notably, the literature discovered that blogs have the lowest level of media richness as a result of their major text-based activity. Content communities such as YouTube and social networking sites such as Facebook and Twitter, on the other hand, scored higher for media richness and social presence due to their combination of text-based communication with the sharing of additional media content such as images and videos (Willis 2019). Furthermore, online ecosystems such as blogs, wikis, media-sharing sites, social-networking sites, and other social-media-based websites have significantly increased the technique and depth of customer-brand engagement (Christodoulides, 2009).

Furthermore, brands' social media marketing operations are classified into five categories, according to Kim and Ko (2012): entertainment, interaction, trendiness, customization, and word-of-mouth. The brand's efforts to create enjoyable and exciting meanings for its users via social media are referred to as entertainment. Consumers are motivated to develop and share user-generated

content on social media, as well as engage in brand society, by entertainment (Gummerus et al 2012). Interaction, on the other hand, is the brand's capacity to allow information to be shared and exchanged with others on social media. The interactive aspect of social media necessitates collaboration and the sharing of content, such as information, video, and images (Hennig-Thurau et al., 2013). The interaction with a company's social media posts is significant since it improves customer feedback, such as liking and commenting on company posts (De Vries, et al., 2012).

Furthermore, trendiness refers to the amount to which a brand publicizes the most recent and up-to-date information about itself. Customers need fast access to brand information as social media grows in popularity, and they regularly use the information accessible on various social media to support purchasing decisions (Dauriz et al., 2014; Vollmer & Precourt, 2008). Similarly, social media is a valuable means of generating up-to-date brand information. Also included in customization is the extent to which a brand's social media allows for personalized information or services. Social media allows you to reach a specific audience more cost-effectively through personalization, and it's also a more reliable information source than other forms of traditional media (Chu et al., 2013; Foux, 2006). Hence, it is at least four times less than costs using traditional marketing methods (Kraft et al 2021).

According to Üstüner and Godes (2006), social media technology has the ability to assist firms in achieving effective sales through customer retention by allowing the firm to comprehend the brand's customer perspective. As a result, corporations value customization or personalization because it boosts total customer devotion to the company (Lacey et al., 2007). Furthermore, it is well known that a tailored social media approach that focuses on reacting to individual customers is more efficient than a collectively oriented social media strategy (Hewett et al., 2016). In fact, their interactive component creates the alluring appearance of a one-to-one connection, inviting readers to respond individually.

2.2. Customer Engagement

Individual customer involvement and connection with the organization's offerings and activities is characterized as consumer engagement (Vivek et al.,

2012). Customer engagement is defined as non-transactional activity toward a brand or firm (Verhoef et al. 2010). The literature indicates that engagement is an emergent issue rather than a mature theme in academic scope. Consequently, there are a lot of extant definitions of the construct spite no definition that has become the benchmark. In fact, engagement focuses on two fundamental tones. The first is the high relation of brands to consumers while the second is the development of an emotional link between consumers and brands (Rappaport, 2007According to Hajli et al. (2017), social engagement of customers with preferred brands in online communities' influences relationship quality in terms of trust, loyalty, and increasing customer-brand connections, which has a beneficial impact on both customer satisfaction and retention.

Customer engagement can be monitored through behaviours such as page views, click-through rates, and other social media platform-specific metrics (Cvijikj and Michahelles 2013). On brand pages, some often utilized customer engagement parameters include "liking," "sharing," and "commenting" (De Vries et al. 2012). According to the literature, customer engagement consists of a variety of behaviors such as consumption, contribution, and creation behaviors that can be used to assess customer involvement with social media content relating to the brand (Schivinski et al., 2016).

Because the aforementioned parameters encompass a wide range of behaviors that exist across numerous social media platforms Many academics use Twitter data to generate proxy metrics. Twitter views itself as the sole source of big data for analysis. Previously, those proxies were thought to represent the distinctive properties of Twitter as a social media network. These three proxy kinds are operationalized using Twitter data and may thus be measured as one composite variable of the mean score of the three types of customer engagement behaviors (consumption, contribution, and creation behaviors) (consumption, contribution, and creation behaviors) with brand-related social media content (Janzen, 2003)., As a result, we turn to predictive approaches to create a model. We examined the tweets of nine American airlines. These companies' tweets were gathered between 2017 and 2021. Text, images, videos, and URL links can all be found in these tweets. The collected tweets are then analyzed using big data analytics. The analysis results are then used to gauge customer engagement and satisfaction.

2.3.Customer Satisfaction

Customer satisfaction is one of the most strategies pertaining to building and maintaining a good relationship between the organization and its customers. Hence, it aims to build a long-term customer relationship, by how to motivate them to want to buy products (Sumardi et al 2011) and respond to the specific needs of each customer (Rust et al 2002). It is defined as an emotional condition characterized by positive feelings (Cronin et al., 2000) as a consequence of an examination of overall consuming experiences, cumulative satisfaction refers to overall customer rating based on the firm's past, current, and future performance, as opposed to particular satisfaction, which encompasses the consumer satisfaction experienced during each transaction with the provider (Anderson et al 1994).

According to Fornell et al. (1996), an overall customer satisfaction Index (ACSI) contains three antecedents: perceived quality, perceived value, and customer expectations, and it is a uniform and comparable measure of total customer satisfaction. Furthermore, it is not just backward-looking or accounts for consuming experience, but it is also forward-looking. Customer satisfaction, according to Zhang et al. (2010), seeks to prevent customer attrition or churn.

Also, Sachi (2012) suggested that customer satisfaction considers one important stage in the process of building a customer engagement cycle that customers utilize to pick which product to purchase.

Therefore, the firm must find ways to build a long-term retention collection with its customers, to insulate its best customers from competitive offers (Rust et al 2002). Notably, through satisfaction, the firm takes advantage of opportunities to strengthen its relationship with the customers. In fact, enhancing customer satisfaction can take numerous forms, such as increasing switching costs to competitors, rewarding actions that improve the retention connection, and deepening the relationship with the customer through emotional attachments (Rust et al 2005).

2.4 The Relation between Social Media Marketing, Customer Engagement, and Customer Satisfaction

Social media kept an ongoing increasing nowadays and almost everyone has a social media account. Marketers believe that social media plays a significant role as an effective marketing tool since it can enhance consumer engagement, which in turn affects customer satisfaction with the company. Business leaders can establish a two-way direct communication channel between their organization and its customers (Muchardie et al 2016). Furthermore, in marketing, social media allows firms to recruit, interact with, retain, and engage with customers (Vinerean and Opreana 2021). This statement is consistent with the philosophy of the customer engagement conceptual framework created by Vivek and colleagues (2012).

According to the framework, an individual involved can develop a more favorable attitude toward the brand and become more loyal to it.

Social media tempts everyone to contribute and share information in an infinite number of ways in a short period of time (Tabroni, 2012). In other words, Sashi (2012) states that a combination of digital technologies can be used to facilitate customer interaction and engagement. In that context, Umunna (2021) indicates that, inefficient social media marketing methods might have a negative impact on customer engagement. Hence, customer engagement influences the consumer experience and adds to customer acquisition, satisfaction, and retention, all of which are critical parts of relationship marketing (Verhoef et al 2010).

Similarly, it is a psychological process that developed the underpinning mechanism model of customer loyalty in new clients of the brand, as well as the mechanism by which customer loyalty may be retained for recurrent purchases (Bowden, 2009). In other words, satisfaction, loyalty, and customer retention consider major outcomes for customer engagement (Vinerean and Opreana 2021). Customer engagement may influence marketing measures, which in turn should influence firm value (Lehmann 2004). Furthermore, when customer engagement is not recognized, consumers may be valued incorrectly (Kumar et al. 2010), which may result in a misallocation of resources between customers

(Verhoef et al 2010). According to another study Kasavana et al (2010), social network marketing has a direct effect on client engagement, loyalty, and satisfaction.

3. The Proposed Model

Scholars must undertake study on social media and consumer engagement in order to improve customer satisfaction, which is still a rare and unusual field of knowledge.

At the same time, it is still attracting the attention of practitioners to know how far the benefits can be obtained from the use both of social media and customer engagement in marketing activities. Eventually we posit that social media marketing research necessitates a new perspective, and that customer engagement is an essential new study stream within customer management and satisfaction. In addition, the Marketing Science Institute sees customer engagement research as a top priority in the next years (Marketing Science Institute [MSI] 2010). As a starting point, the research hypotheses are formed and illustrated in Figure 1. As the figure shows, the study states three hypotheses as follows:

- **H1**: Social media marketing has a significant positive effect on online customer engagement.

  - **H1a:** Customization has a significant positive effect on online customer engagement.

  - **H1b:** Entertainment has a significant positive effect on online customer engagement.

  - **H1c:** Trendiness has a significant positive effect on online customer engagement.

  - **H1d:** Interaction has a significant positive effect on online customer engagement.

- **H2:** Online customer engagement has a significant positive effect on customer satisfaction.

- **H3:** Social media marketing is positively associated with customer satisfaction beyond its effect through online Customer engagement.

- **H4:** Social media marketing has a significant direct effect on customer satisfaction.

  • **H1a:** Customization has a significant direct effect on customer satisfaction.

  • **H1b:** Entertainment has a significant direct effect on customer satisfaction.

  • **H1c:** Trendiness has a significant direct effect on customer satisfaction.

  • **H1d:** Interaction has a significant direct effect on customer satisfaction.

Therefore, to validate the research hypotheses, the study focuses on a set of moderator measures to predict the influence of social media marketing and customer engagement on customer satisfaction. The study focuses on eleven measures shown in Table 1. The table summarizes the definition and the methods to quantify each measure regarding the Twitter data. In the following subsections, we discuss the main phases followed in the research to validate the research hypotheses and study the influence of social media marketing on customer satisfaction.
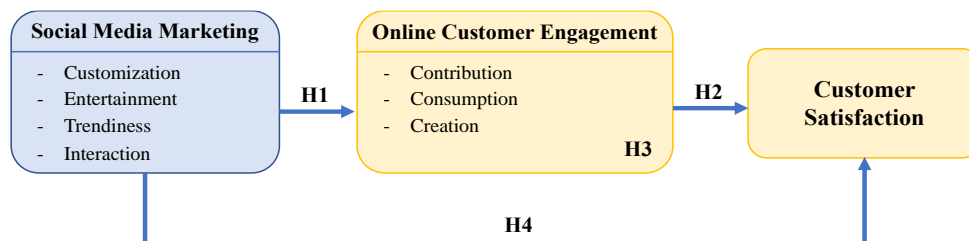

Figure 1: The effect of Social Media Marketing and Customer Engagement on Customer Satisfaction

TABLE 1: Moderator Measures to predict Social-Media Marketing and Customer Engagement impact on Customer Satisfaction

Measure	Definition	Measurewent
Interaction	refers to various opportunities in which customers can interact with a brand's social media accounts.	The aggregate number of tweets sent by the company, plus the number of hashtags, mentions, and URLs contained in those tweets (Liu et al 2021and Kim & Ko 2011).
Customization	refers to replying to customers or sending direct messages to them.	The number of tweets made by the brand in response to a certain customer. (Liu et al 2021).
Entertainment	refers to delivering fun and interesting content that increases consumer excitement about the brand so that even non-owners can become involved and inspired to share brand-related social media material with their friends and acquaintances.	Natural language processing algorithms are used to examine company tweets and determine whether they contain linguistic components that reflect fun and interesting dimensions. The methods identify a set of words that adequately depict both fun, interesting and fascinating qualities. Then, we filter and count the total number of Tweets made by American airline companies that include a list of words expressing the two scales "fun" and "interesting" (Kim and Ko's, 2012).
Trendiness	refers to keeping customers informed and up to date on new products, events, and information.	Natural language processing algorithms are employed to analyze the textual components of tweets and state whether or tweet contains textual components that represent the newest information and trendy dimensions. We identify a group of words that adequately portray new and trendy information. Then, we filter and count the total number of tweets created by the American airline firms containing the list of words that express the two-scale "newest" and "trendy" (Kim and Ko's, 2012).
Consumption	refers to customers who just browse brand-related	The total number of unique individuals who used "@brand" in their tweets. and the number of

Measure	Definition	Measurement
	online social media without interacting.	users who follow the brand social media account (Liu et al 2021 and Schivinski et al 2016).
Contribution	refers to customers who contribute moderately to brand-related social media content.	The total number of "retweets" (shares) and "likes" on tweets posted by the brand. (Liu et al 2021 and Schivinski et al 2016).
Creation	refers to the highest level of consumer creation and online publication of brand-related content.	The overall sum of customer-generated tweets that mention a brand. (i.e., customers who mention the brand "@brand and initiate posts, post pictures/graphics, and write reviews) (Liu et al 2021 and Schivinski et al 2016).
Online customer engagement	The customer cognitive and affective commitment to dynamic interactions with the brand as exemplified by the company website or other computer-mediated entities.	Measured as one composite variable of the mean score of the three categories of customer engagement activities (consumption, contribution, and creation behaviors) with brand-related social media content (Janzen, 2003; Liu et al 2021 and Schivinski et al., 2016).
Customer satisfaction	defined as an emotional state with positive feelings	Measured by using the American Customer Satisfaction Index, which is broad enough to be comparable across companies, industries, sectors, and countries.
Firm size		Measured by the value of the total assets of the company or the total number of employees in the company.
Market share		Measured by the company sales over a specific period divided by the total sales of the industry over the same period

4. Big Data Analytics: Twitter Data Preparation and Measures Extraction

To extract the moderator measures, Twitter data for the nine American airlines

are collected, prepared, and analyzed using natural language processing. The activities performed in this phase can be grouped into three main stages: data collection, preparation, and measure extraction. A detailed illustration of the phase is presented in Figure 2.
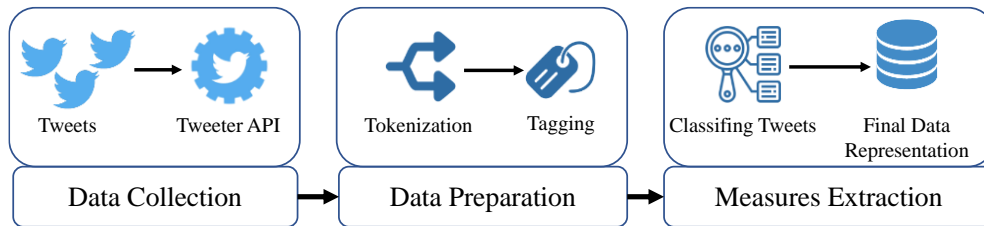

Figure ٢: A Component Overview of The First Phase.

4.1 Data Collection

Data gathering is the first stage of Twitter content analysis. The practice of gathering and measuring data for analysis from specified resources is referred to as data collection. In our settings, we define our sources as the timelines of the nine American airlines: United Airlines, Delta, American, Southwest, Spirit, Alaska, Jetblue, Frontier, and Allegiant. In this stage, tweets are collected from the Twitter API. The most essential aspect of data collection is ensuring that reliable data is collected for statistical analysis. Therefore, we only consider the official accounts of the firms to fetch historical tweets through Twitter API. To use Twitter API, we registered an app through a Twitter developer account and obtain consumer and access keys. Then, these credentials are used to authenticate the access to fetch the tweets. Historical tweets are then extracted using the Tweepy package (Hasan et al, 2018) for python to access the Twitter API. The raw tweets are stored in a special format called Pandas DataFrame (Wisdom and Gupta, 2016) which is a two-dimensional tabular data structure. After fetching the tweets, the tweet data can be saved in a CSV (comma-separated values) file format (Hasan et al, 2018). The extracted data for each tweet includes the Tweet content, time of creation, screen name, number of retweets, favorites, and replies. Since the values of retweets, favorites and replies can change after the tweet is posted, the tweets are downloaded at least one month after the time of creation. Therefore, we ensure that the values of these dynamic variables do not change after the data has been retrieved.

4.2 Data Preparation

Then, in the second stage, data is prepared to extract moderator measures. Therefore, to prepare the data, we first performed a series of string manipulations and regular expression functions to remove any special tokens or characters. For instance, we used the string library to remove punctuations and stop words (e.g., in, to, etc). Then, we applied regular expression functions to remove URLs, emojis, and hashtags. After that, we performed a series of NLP procedures using the TweetNLP library to tokenize and tag the tweet text (Hasan et al, 2018). Tokenization aims to split the tweet text into words (tokens), while tagging tries to identify the word class based on its position in the sentence. To tokenize tweets, we used the TweetNLP library to split the words with their stem words. The NLP function automatically tokenize tweets by identifying the spaces between words. Then, the tweet contents are tagged to identify the words that are most associated with the existence of entertainment and trendiness characteristics in the textual component of tweets. The final step is to perform one-hot encoding on the categories, converting the categories (fun, interesting, new, and interesting) into a dictionary of [0,1] corresponding to the actual label of the text. Hence, the qualitative variables such as tweet text are expressed as quantitative values to express both trendiness and entertainment.

4.3 Measures Extraction

The output of the data preparation stage is the final dataset that is ready to be analyzed to extract the required measures. The dataset includes both quantitative variables (e.g., Retweets, Favorites, and Replies) and qualitative variables (e.g., tweet text). Since the quantitative data is transformed into quantitative data using the NLP procedures from the second stage, the final dataset comprises 16 elements shown in Table 2.

TABLE 2: The Final Dataset Extracted from Twitter Data.

Featured	Description
Tweet Text	The actual text of the status update.
Tweet ID	A unique identifier for the tweet.

Featured	Description
Time of Creation	The time this Tweet was created was UTC.
Screen Name	This field will contain the screen name of the original Tweet's author if the Tweet is a reply.
Picture Or Video	Flag to specify if the tweet contains media objects such as pictures or videos.
Is reply	Flag to specify if the tweet is a reply or not.
Retweets	Number of retweets.
Favorites	Number of favorites.
Replies	Number of replies.
Hashtags	A list contains the hashtags in the tweet.
Num of Hashtags	Number of hashtags the tweet contains.
URLs	A list contains the URLs in the tweet.
Mentions	A list contains the mentions in the tweet.
Num. of Mentions	The number of mentions the tweet contains.
Entertainment	A flag representing if the tweet contains content related to the fun and interesting dimension.
Trendiness	A flag representing if the tweet contains content related to the new and trendiness dimension.

The final dataset is then analyzed using Python to aggregate the data points into annual and monthly sets using the time of creation feature. The data is aggregated to represent the number of tweets produced by each company during the years and months from 2017 to 2021. The output of this stage is used as an input to the econometric analysis.

5. Building The Econometric Model

The authors include additional company-specific covariates in the control variables to adjust for other characteristics that are well known to effect social media marketing, online consumer engagement, and firm performance represented in customer

satisfaction. The Hirschmann–Herfindahl index is used to account for competitive intensity. as $HHI = (1 - \text{Market share})^2$ To adjust for scale economies, we additionally control for business size (total assets). Tables 2 and 3 summaries the research dataset's correlations and descriptive statistics for each variable. Consequently, we run the SM SAR GMM method (Liu and Saraiva 2017) to analyze the panel data generated in the first phase. The panel data consists of numbers of monthly observations for the top nine American airline companies with the highest market share. We express the basic model as:

$$\text{Online customer engagement}_i^t = \beta_1 \text{ entertain}_i^t + \beta_2 \text{ interact}_i^t + \beta_3 \text{ custom}_i^t + \beta_4 \text{ trend}_i^t + \propto_i + \varepsilon_i^t \qquad (1)$$

$$\text{Customer satisfaction}_i^t = \beta_1 \text{ entertain}_i^t + \beta_2 \text{ interact}_i^t + \beta_3 \text{ custom}_i^t + \beta_4 \text{trend}_i^t + \beta_5 \text{ consump}_i^t + \beta_6 \text{ contrib}_i^t + \beta_7 \text{ creat}_i^t + \beta_8 \text{ firm\_size}_i^t + \beta_9 \text{ HHI}_i^t + \propto_i + \varepsilon_i^t$$
$$(2)$$

where i = 1, …, N refers to the ith American airline company where N=9, and t = 1, …, T refers the tth month in the specified time period where T = 60 months. The specified time spans from January 2017 to December 2021 and produces 540 observations. Hence, the Online engagement$_i^t$ represents customer engagement with the i^t American airline company at time t. Similarly, entertain$_i^t$, interact$_i^t$, trend$_i^t$, and custom$_i^t$ represent the entertainment, interaction, trendiness, and customization of the ith company at time t time, respectively.

Finally, customer satisfaction$_i^t$ represents customer satisfaction with American airline companies, which is driven by The American Customer Satisfaction Index (ACSI) for the ith American airline company at time t. Moreover, consump$_i^t$, contrib$_i^t$, and creat$_i^t$ represent the consumption, contribution and creation of the the ith American airline company at time t respectively; $\propto_i$ is the unknown intercept (i.e., the fixed effects), and ε it is the random error.

In the case of the simultaneous equation (SM), Once the observations in (SM) are locations with spatial autocorrelation, a spatial dependence model can be applied. Spatial autoregressive regression is used to model the addition of dependencies to endogenous variables (SAR). For a simultaneous equation (SAR) model, a Generalized Method of Moments (GMM) estimator and its

heteroskedasticity-robust standard error, is preferred (Liu and Saraiva 2017). One of the advantages of this method is that it does not imply any distributional assumption so there is no need for testing the normality assumption. Also, it performs well in finite samples. Therefore, we employed an SM SAR GMM method to examine panel data consisting of monthly observations for nine American airlines In Stata 16, we used the (GMM) function. Descriptive statistics are included in Tables 3 and 4, respectively.

TABLE: 3 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Interaction	540	32.0	35485.0	5578.9	6275.8
Customization	540	10.0	25912.0	3234.7	3895.8
Entertainment	540	14.0	30857.0	3847.3	4250.8
Trendiness	540	11.0	15945.0	2002.8	2370.8
Consumption	540	63501.0	2139032.0	1016752.3	798233.3
Contribution	540	74.0	339650.0	28282.6	41295.6
Creation	540	46.0	133388.0	12132.0	18826.1
Online Customer engagement	540	21222.0	759124.0	352389.0	275050.5
size	540	2090.3	73406.0	29325.6	23479.0
Satisfaction index	540	60.5	84.3	73.2	5.9
HHI	540	0.6	1.0	0.8	0.1

TABLE :4 Correlation Matrix for Research Variables

	Consumption	Contribution	Creation	Online Customer engagement	Satisfaction index
Consumption	1	.425**	.424**	.998**	.670**
Contribution	.425**	1	.552**	.474**	.143**
Creation	.424**	.552**	1	.460**	.201**
Online Customer engagement	.998**	.474**	.460**	1	.660**
Satisfaction index	.670**	.143**	.201**	.660**	1
**. Correlation is significant at the 0.01 level (2-tailed).					

6. Results

Table 5 highlights the major effects and mediation estimates of expected relationships in regard to the research hypotheses. The Wald test verifies that the model specification presented fits the data. Furthermore, Hansen's T Chi [2] is 0.6743, p=0.8114, that indicates there is no overidentification problem, because p-values for is greater than 5%, according to Sargan –Hansen test or Sargan's test. Notably, the estimates for the direct impact model specification (M1) in Table 5 show that that absent any inclusion of our hypothesized "mechanism". The following sub drivers describe online consumer engagement constructs and social media marketing:

- According to its relative impact power, trendiness (H4c), customization (H4a), and entertainment (H4b) are all positively associated with customer satisfaction (β = 44.29, p.01), (β = 19.19, p.01), and (β = 12.45, p.05), respectively, in accordance with Jamil et al (2021).

- Furthermore, interaction (H4d) has no significant effect on customer satisfaction. Hence, this may depend on the degree of relational exchange and

emotional ties that characterize their relationships with airline companies. As a result, these relations should be investigated (Sashi 2012). Simultaneously, Hutter and Hautz (2013) show that annoyance with social media content has a negative impact on the evaluation of both brands and consumer behavior.

- Our findings imply that, after controlling for firm size and competition intensity, social media marketing is linked to higher customer satisfaction as a superior firm performance which is partially in support of H4.

The M2 model estimates in Table 5 reveal that a firm's social media marketing sub drivers have the following positive effects on online customer engagement in terms of the primary hypothesized relationships of interest:

- Trendiness (H1c), Customization (H1a), and Entertainment (H1b) are positively associated with online customer engagement ($\beta = 39.18$, p < .01), ($\beta = 17.37$, p < .01), ($\beta = 13.18$, p < .05), respectively according to its relative effect power.The obtained findings are cope with previous research (Liu et al 2021; Schivinski et al 2016; Kim& K0 2012). However, the findings show that interaction has an insignificant effect on online customer engagement. One possible explanation for this unexpected finding is that customer engagement is a context-dependent psychological state (Nunan et al 2018; Brodie et al 2013) that is typically focused on interactive consumer experiences rather than transactional interactions (Vivek et al 2012), which partially in support of H1.

To investigate the possibility of reverse causality, we first performed a Granger causality test, which revealed that social media marketing causes firm online customer engagement rather than vice versa. These findings are consistent with the Granger test, indicating that online customer engagement does not predict social media marketing and ruling out reverse causality. Overall, these analyses show that social media marketing is a structural predictor of superior online customer engagement; these results are consistent with H1.

In addition, the M3 model estimates in Table 5 show that online customer engagement has a positive effect on customer satisfaction ($\beta = 1.124$, p.01).

According to the table 4, consumption has the greatest effect, with a strong significant correlation (.670, p.05). As a result, these findings support H2. Overall, the M3 model findings that firms with superior online customer engagement enjoy superior customer satisfaction over time.

We also test H3 using Baron and Kenny's logic [2], which states that if online customer engagement mediates the effect of social media marketing on customer satisfaction, we will find that (1) social media marketing forecasts online customer engagement, (2) online customer engagement forecasts customer satisfaction, and (3) the direct effect of social media marketing on customer satisfaction is weaker when the effect of online customer engagement is considered.

Moreover, as shown in Table 5, M2 and M3 findings suggest that (1) social media marketing, as reflected in Trendiness (H3c), Customization (H3a), and Entertainment (H3b), are positively predicting online customer engagement with coefficients of 44.29 ($p < .01$), 19.19 ($p < .01$), 12.45 ($p < .05$) respectively; (2) online customer engagement forecasts   customer satisfaction, with coefficients of 1.124 ($p < .01$), (3) the direct effect of social media marketing on customer satisfaction is weaker when the effects of the online customer engagement are considered. The coefficients of Trendiness, Customization and Entertainment direct effect are 44.29 ($p < .01$), 19.19 ($p < .01$), 12.45 ($p < .05$) respectively; while the effect is stronger in the case of indirect effect with coefficients of 44.90 ($p < .01$), 19.98 ($p < .05$), 17.84 ($p < .01$) respectively, with an insignificant effect for driver of interaction in both cases.

Therefore, it was logical for companies to enhance their usage of social media in the previous ten years, recognizing the critical role that social media plays in both customer engagement and customer satisfaction, which reflects positively on consumer buying behavior (Dauriz et al., 2014; Kim & Ko, 2012; Scott, 2015). As a result, these findings support H3.

TABLE5: Effects of Social Medi Marketing & online customer engagement on Customer Satisfaction

Variables	M1	M2	M3
	Social Media Marketing and Customer Satisfaction	Social Media Marketing and Online Customer Engagement	Social Media Marketing, Online Customer Engagement and Customer Satisfaction
Customization	(H4a) 19.19***	(H1 a) 17.37***	(H3 a) 19.98**
	(4.076)	(6.119)	(7.673)
Entertainment	(H4b) 12.45**	(H1 b) 13.18**	(H3 b) 17.84***
	(4.643)	(6.523)	(6.748)
Trendiness	(H4c) 44.29***	(H1 c) 39.18***	(H3 c) 44.90***
	(8.19)	(10.10)	(12.75)
Interaction	(H4d) 2.487	(H4 d) 3.999	(H3 d) 0.950
	(3.432)	(4.432)	(6.040)
Online Customer engagement			(H2) 1.124***
			(0.0757)

Variables	M1	M2	M3
HHI	29.75***	38.35***	
	(2.443)	(3.418)	
size	-8.48e-05***	-9.06e-05***	
	(2.36E-05)	(1.55e-05)	
Constant	112.5***	108.3***	
	(2.145)	(3.264)	
Observations	540	540	540
Specification tests			
Wald chi-square (df)	79.345***	74.22***	
Hansen's T Chi(2) p-value	0.6743	0.8114	
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

7. Conclusions and Managerial Implications

This study provides additional managerial insights that could be obtained by determining the various roles that each dimension plays in contributing to

customer engagement and its relationship with non-financial performance represented in customer satisfaction.

The current study additionally extends the brand literature's previous operationalization of customer engagement behavior with social media activities by assessing consumption, contribution, and creation activities collaboratively, and translating it into action. Therefore, the literature shows several gaps in the research on customer engagement on social media, especially in the sector of airline companies.

Our findings imply that American airline companies' use of social media to boost trendiness, customization, and entertainment pays off in terms of enhancing customer engagement with brand-related social media content. As a result, this research shows its most significant implications for practice which is the importance of investing in the trendiness, customization, and entertainment aspects of social media activities for American airline firms.

First, entertainment activities can be promoted by giving enjoyable and fascinating content that helps clients become acquainted and familiarity with the airlines. Customers can so become sufficiently involved to encourage their peers and acquaintances to share brand-related social media content.

Next, corporations may give numerous possibilities for their customers to participate in their social media in order to increase entertainment activities with airline customers. Customers, for example, can be encouraged to engage in and create material for social media campaigns (Hughes et al., 2016; Phan et al., 2011; Straker & Wrigley, 2016), or to share pictures and publish images from social media for their online sites (Scott, 2015). Managers should also encourage trendiness activities by keeping customers informed about core, actual, and augmented services (Dauriz et al., 2014; Phan et al., 2011). By offering up-to-date information on social media, airline companies improve their positioning as trendy and aspirational and enrich customer engagement with social media activities (Phan et al., 2011; Straker & Wrigley, 2016)

Second, in the same direction, airline firms should use the online to manage customer interactions with the specific goal of customer engagement, satisfaction, and R&D activities by creating a virtual community of customers to best explain customer needs.

They should use agile methodologies to obtain insights into new services, allow customers to share knowledge and support one another, and actively engage with strong relationships in the service design (Hanssen and Faegri, 2006), and market testing stages, as well as the value-adding process (Sawhney et al., 2005). Additionally, managers should seize social media activities primarily to gather information and learn about consumers and their attitudes toward products and brands (Butter and Hautz 2013).

Third, advertisers should closely and systematically pay attention to social media platforms and activities in which consumers are more passionately engaging with their brands in relation to each customer engagement component (contribution, consumption, and creation).

Moreover, they should try to encourage the activities in which they want consumers to be more active, so that tight implementation of the previous three levels into social media communications plans may be achieved to benefit businesses (Schivinski et al. 2016).

Finally, the marketing analytics technique may be valuable for resource allocation decisions. As a result, these analytics can be used to optimize the link between inputs (social media marketing activities) and outputs (consumer engagement and satisfaction) in order to better serve the strategic side of marketing, which is the primary concern for senior management.

8. Limitations and Further Research

The current study has several shortcomings that point to future research directions. First, the research is limited to the airline industry. Hence, it may be useful to conduct the same study on other services and goods industries. Since each industry has unique characteristics that distinguish it from other industries, further studies can represent a more comprehensive and a lot of different ways in order to improve the implementation of the results.

Also, more research can aim at creating knowledge accumulation about the extent of the strength of social media marketing and its effect on both customer engagement and other financial performance such as profitability function.

Similarly, the research is limited to one of the developed markets (USA) with cultural specificity, and it may be useful to conduct a comparative study with other developing markets and determine the extent to which cultural differences reflect the strength of social media marketing and customer engagement, and then future profitability in the short and long terms.

Finally, another potential work path is to expand this approach to focus on diverse categories of travelers' customers. Airlines are examining their digital marketing strategy and investing in social media to communicate with their current and potential customers, presenting a persuasive concept to analyze customer engagement based on this customer segmentation.

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